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Monthly Engineering Report No. 5

Improvement of Wide-Band FM Radar
Detection Techniques

Period Covered: 1 February 1961 to 28 February 1961

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General Comments

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This report covers the fifth period of contract activity for Improvement of FI Radar Detection Techniques.

The job has been staffed by two senior engineers working part time, as required, and by three full time engineers. The period has been devoted to basic design of components to be used in a fully implemented breadboard system.

Activities of the Report Period

A high frequency sawtooth generator has been constructed. The highest obtainable sweep frequency has been 14 mc for which flyback time approached 15%. Lowering the sweep frequency allows for flyback improvement. Because sideband suppression in the serrodyne technique of frequency translation is a function of flyback time, it is important that this factor be reduced. Continued effort is being placed on improving the flyback characteristic while maintaining a high sweep frequency.

The intermediate frequency resulting from the translation process must be heterodyned to a lower frequency consistent with the frequency separation of the signal components. An oscillator and mixer has been designed and tested for a 10 mc intermediate frequency. The design frequency may be readily shifted for any frequency required.

A preliminary design of the active filters has been made and is now being breadboarded. Provision is being made for sampling and dumping the filter at the end of each RF sweep.

The mechanical area scanner is virtually complete, requiring only one remaining part which is in fabrication. Upon its completion, the scanning system will be operated in conjunction with the initial system, previously developed for basic system experimentation.

High voltage sweep circuits for the Backward Wave Oscillator are operating. Refinements in the linearity and sweep range adjustments are currently underway. Delivery of the Backward Wave Oscillator is expected daily.

Program for the Ensuing Month

All of the work herein outlined will continue during the next period. Some of the work will be concluded and other portions of the system will be begun. The principal work to be started is the digital circuitry required for sampling the filter outputs and for providing the appropriate display voltages.

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